

WATER BAR PLACEMENT AND CONSTRUCTION GUIDE  
FOR  
SIUSLAW FOREST ROADS

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## Introduction

The following water bar spacing information is provided to assist field persons in placing water bars at their most effective locations.

This guide stresses the importance of water bar location as a function of water collection and discharge. It includes a water bar spacing table to facilitate placement of water bars according to road and soil conditions.

## Water Bar Location Process

The first step is to plan for water bars at critical locations using guidelines for water collection and discharge. Then select additional locations to meet spacing requirements shown in Table 1. See attached drawing for typical water bar locations.

## Water Collection Guidelines

Place water bars at natural small drainages that may not have justified a ditch relief culvert at the time of design. Try to keep as much of the water in its natural route as possible even if it requires an extra water bar.

Place water bars to back-up culverts that provide ditch relief or natural channel flow.

Place water bars to prevent road surface and cutbank sedimentation from entering directly into natural drainage channels.

Place water bars to dissipate water prior to steep grades.

If road grade varies, place water bars on the flatter slopes (grade breaks). This makes driving through them easier, and the water bars will last longer.

Place water bars at road seeps, springs and wet subgrades to collect this water and quickly discharge it off the road. These areas may be notorious for potholes or rutting.

Place water bars to effectively reduce ditch erosion. Reduce the upper reach of the ditch by a length greater than the area showing ditch erosion. For example: if the lower 90 feet of ditch shows signs of erosion, eliminate at least the first 90 feet of ditch by using a water bar.

Water Discharge Guidelines - consider these items for all waterbars.

Discharge onto undisturbed areas, preferable rocky ground or areas protected with vegetative cover.

Avoid discharging directly over fills. Seek natural ground areas first and then areas along edges of fills.

On steep slopes discharge on convex slopes rather than draws.

Avoid crossing road or shoulder cracks especially where steep slopes or side cast construction is evident.

If a vegetated or rocky location is not found, reduce water bar spacing to match native soil conditions found in Table 1.

Water Bar Spacing Guidelines

Water bar location may be determined by measuring or estimating the distances and grades in Table 1. Care should be taken not to exceed 150% of distances shown. During storms in 1996 several water bars exceeding 150% of recommended spacing received so much water that the water bars themselves had excessive erosion.

The spacing shown for native surface roads is typical for most of the Siuslaw's soils. If fine and light soils (silt & silty sands) are encountered, reduce spacing by 20%. If silty clay or sandy clay soils are encountered, spacing may be increased up to 50%.

Table 1 Typical Water Bar Spacing

Road grade	Aggregate surfaced with vegetated/rocky discharge point		Native surface or barren soil discharge points	
	Feet	Meters	Feet	Meters
1-3	600	200	100	35
4-6	300	100	80	25
7-9	200	70	70	23
10-12	150	50	60	20
13-18	120	40	50	15
19+	80	25	30*	*

\*Consider using surface protection measures such as aggregate.

Spacing table based on information from the following sources:

A. Guides for Controlling Sediment from Secondary Logging Roads, FS Northern Region Missoula, Montana, and Intermountain Forest and Range Experiment Station, Ogden, Utah.

B. Maximum spacing allowable to handle the rainfall intensity of a 25 year storm. An Introduction to Forest Soils of the Douglas Fir Region of the Pacific Northwest, Arnold J., 1957.

C. Observation of water bar performance on Siuslaw forest roads by Robert Avila and Charlie Warren, post 1996-1997 storm events.

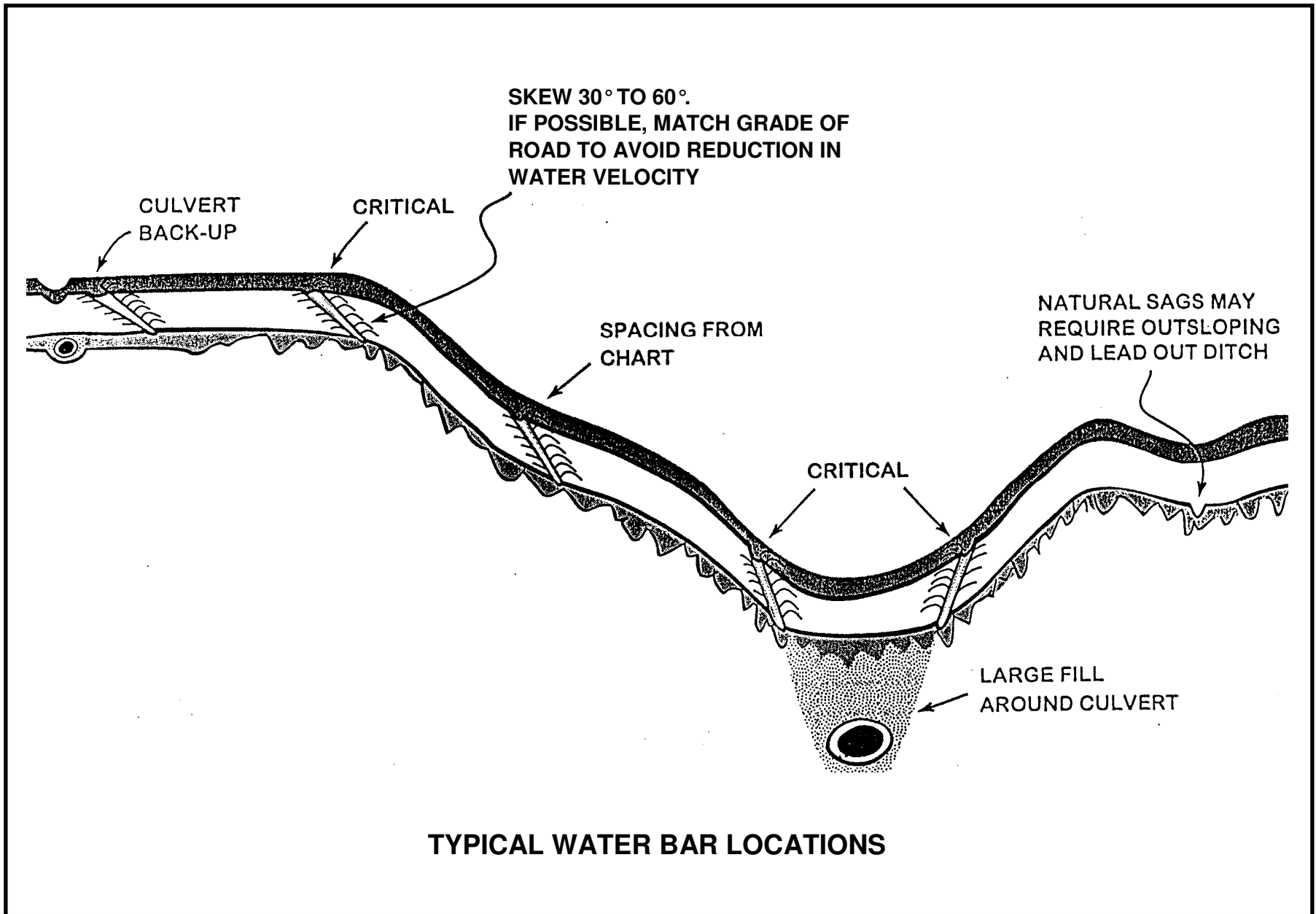
## WATER BAR CONSTRUCTION GUIDELINES

Type II Water Bars: The water bar construction described below is intended for high-clearance vehicles. Roads would be in maintenance level I or II.

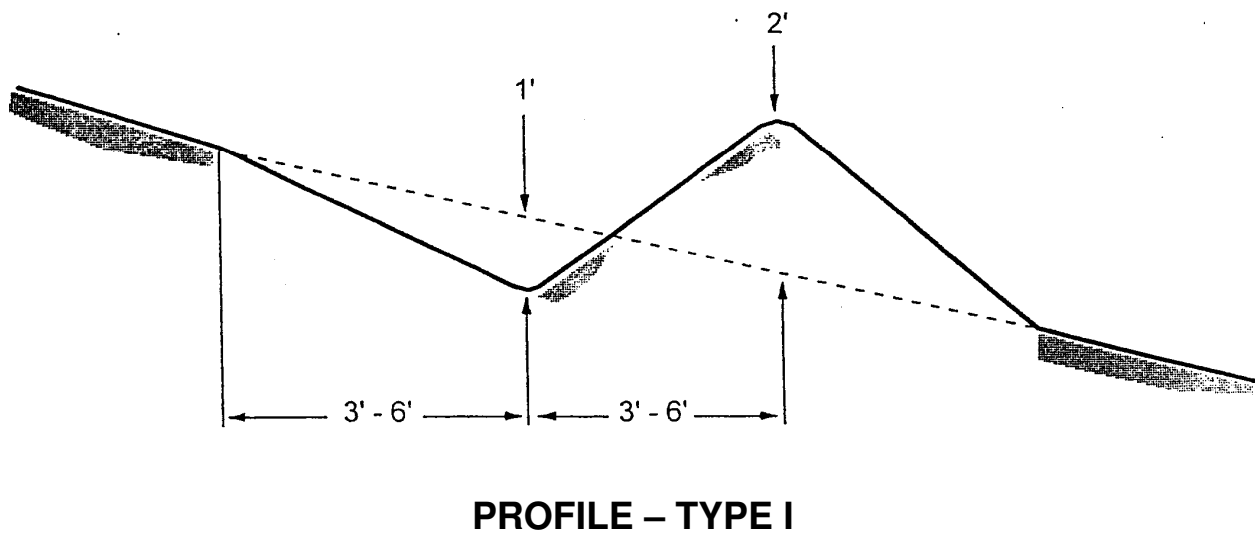
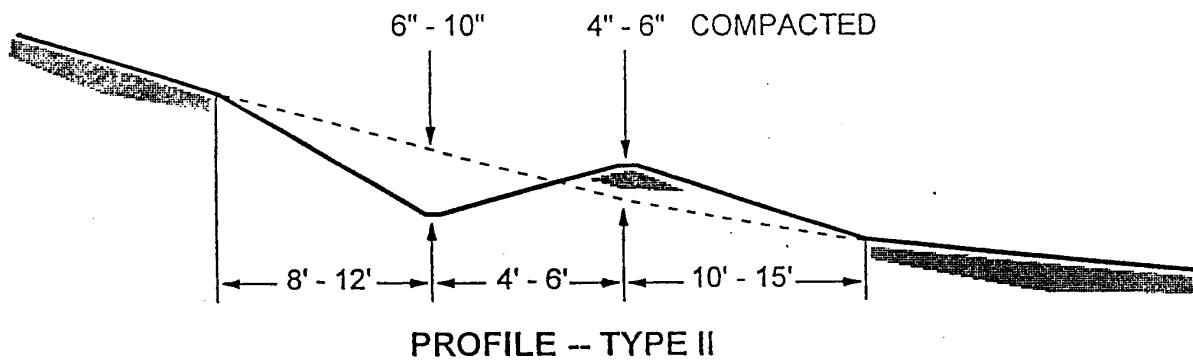
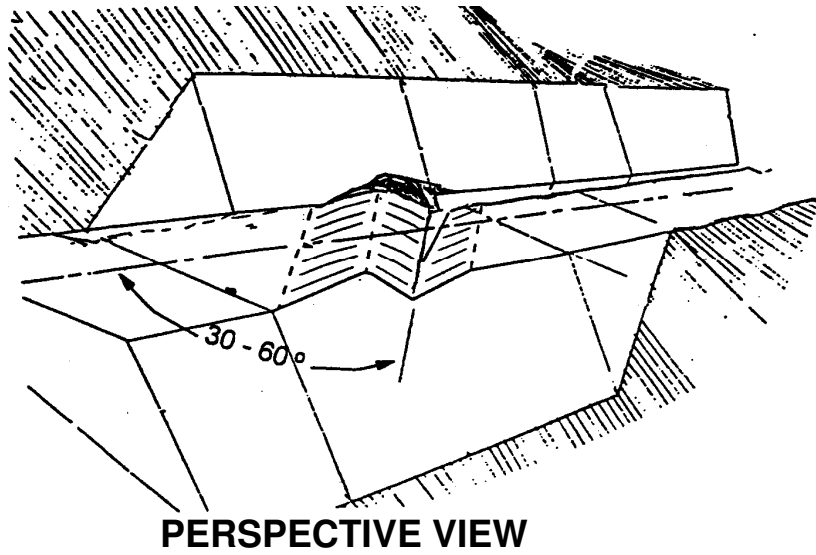
- AGGREGATE ROADS  
Water bars that cut through the aggregate base of a road and reach erosive soils need to have aggregate surfacing bladed back into the water bar channel.
- COMPACTION OF BERM  
Compaction of the excavated material used to make the berm on the downhill side of the water bar is recommended. Wheel-rolling or walking the excavation equipment over the downhill berm is adequate.
- ROADSIDE DITCHES  
Intercept ditch water by including a ditch block during construction of all water bars. It is acceptable to have ponding of water in the ditchline where roadside ditches are deeper than the water bar.
- SKEW  
Construct with a 30 to 60 degree angle from road centerline. This facilitates easier travel by vehicles and an increased water run off slope.
- DEPTH and WIDTH  
Construction dimensions for a water bar are shown on the attached typical. For road grades over 10% the cut depth and berm height should approach maximum values.

Type I Water Bars: Intended for use on roadbeds that will not have traffic. Use on closure of temporary roads, roads to be obliterated, or long term closure of roads in maintenance level I. These water bars are designed to remain effective until the road prism stabilizes with vegetation.

- ROADSIDE DITCHES  
Intercept ditch water by including a ditch block during construction of water bars.
- SKEW  
Construct with a 30 to 60 degree angle from road centerline.



## WATER BAR CONSTRUCTION DETAILS



NOTE: Block ditchline with excavated material to prevent ditch water from bypassing waterbar.